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Application Serial No: 10/712,770

Responsive to the final Office Action mailed on: February 6, 2009

IN THE CLAIMS**Amendments To The Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-17. (Cancelled)

18. (Currently Amended) ~~The~~ A solid-state image sensing device comprising:
according to claim 6;

vertical transfer parts provided corresponding to respective columns of
bidimensionally arranged pixels to vertically transfer signal charges read out from the
pixels; and

a horizontal transfer part for horizontally transferring the signal charges received
from the vertical transfer parts,

wherein the vertical transfer parts include transfer stages, those located closest to
the horizontal transfer part being vertical last stages, and the vertical last stages have
transfer electrodes formed to have identical configurations repeated every m (m denotes
an integer of 2 or higher) columns,

vertical last stages of columns other than one of the m columns or all vertical last
stages of the m columns each are provided with a transfer electrode that is independent of
those of other vertical last stages of the m columns so that an operation of transferring
signal charges from the vertical last stages concerned to the horizontal transfer part is
controlled independently of said other vertical last stages,

the integer m is $2n+1$ (n denotes an integer of 1 or higher), and

signal charges of pixels included in each of first and second pixel mixture groups
are added together in the horizontal transfer part,

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where the first pixel mixture groups each are composed of $2n+1$ (n denotes an integer of 1 or higher) pixels arranged at every other pixel in a horizontal direction of the bidimensionally arranged pixels, and

the second pixel mixture groups each are composed of $2n+1$ pixels that are arranged at every other pixel and are pixels other than those of the first pixel mixture groups in the horizontal direction of the bidimensionally arranged pixels, with centers of gravity of the pixels of the respective second pixel mixture groups each being located at an equal distance from centers of gravity of the pixels of two first pixel mixture groups adjacent thereto,

wherein the vertical last stages located closest to the horizontal transfer part of the vertical transfer parts have transfer electrodes formed to have identical configurations repeated every three columns,

vertical last stages of at least the second and third columns of the three columns, counted as from an output side of the horizontal transfer part, each are provided with a transfer electrode that is independent of those of the other vertical last stages so that an operation of transferring signal charges from the respective vertical last stages concerned to the horizontal transfer part is controlled independently of the other vertical last stages,

wherein a vertical last stage of each column is formed with more than four transfer electrodes, and

in all vertical transfer parts of three columns adjoining each other, among the six transfer electrodes, those located second and fourth from a side of the horizontal transfer part are independent electrodes that are independent of those of vertical last stages of the other columns, and the electrodes other than those located second and fourth are electrodes common to the other stages of the respective vertical transfer parts.

19. (Currently Amended) ~~The~~ A solid-state image sensing device comprising:
according to claim 6,

vertical transfer parts provided corresponding to respective columns of bidimensionally arranged pixels to vertically transfer signal charges read out from the pixels; and

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a horizontal transfer part for horizontally transferring the signal charges received from the vertical transfer parts,

wherein the vertical transfer parts include transfer stages, those located closest to the horizontal transfer part being vertical last stages, and the vertical last stages have transfer electrodes formed to have identical configurations repeated every m (m denotes an integer of 2 or higher) columns,

vertical last stages of columns other than one of the m columns or all vertical last stages of the m columns each are provided with a transfer electrode that is independent of those of other vertical last stages of the m columns so that an operation of transferring signal charges from the vertical last stages concerned to the horizontal transfer part is controlled independently of said other vertical last stages,

the integer m is $2n+1$ (n denotes an integer of 1 or higher), and

signal charges of pixels included in each of first and second pixel mixture groups are added together in the horizontal transfer part,

where the first pixel mixture groups each are composed of $2n+1$ (n denotes an integer of 1 or higher) pixels arranged at every other pixel in a horizontal direction of the bidimensionally arranged pixels, and

the second pixel mixture groups each are composed of $2n+1$ pixels that are arranged at every other pixel and are pixels other than those of the first pixel mixture groups in the horizontal direction of the bidimensionally arranged pixels, with centers of gravity of the pixels of the respective second pixel mixture groups each being located at an equal distance from centers of gravity of the pixels of two first pixel mixture groups adjacent thereto,

wherein the vertical last stages located closest to the horizontal transfer part of the vertical transfer parts have transfer electrodes formed to have identical configurations repeated every three columns,

vertical last stages of at least the second and third columns of the three columns, counted as from an output side of the horizontal transfer part, each are provided with a transfer electrode that is independent of those of the other vertical last stages so that an operation of transferring signal charges from the respective vertical last stages concerned to the horizontal transfer part is controlled independently of the other vertical last stages,

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~~wherein~~ a vertical last stage of each column is formed with more than four transfer electrodes,

in vertical transfer parts of two of three columns adjoining each other, among the transfer electrodes, those located second and fourth from a side of the horizontal transfer part are independent electrodes that are independent of those of vertical last stages of the other columns and the electrodes other than those located second and fourth are electrodes common to the other stages of the respective vertical transfer parts, and

in a vertical transfer part of remaining one of the three columns adjoining each other, all the transfer electrodes are electrodes common to the other stages of the vertical transfer part concerned.

20. (Currently Amended) ~~The~~ A solid-state image sensing device comprising:
~~according to claim 6;~~

vertical transfer parts provided corresponding to respective columns of
bidimensionally arranged pixels to vertically transfer signal charges read out from the
pixels; and

a horizontal transfer part for horizontally transferring the signal charges received
from the vertical transfer parts,

wherein the vertical transfer parts include transfer stages, those located closest to
the horizontal transfer part being vertical last stages, and the vertical last stages have
transfer electrodes formed to have identical configurations repeated every m (m denotes
an integer of 2 or higher) columns,

vertical last stages of columns other than one of the m columns or all vertical last
stages of the m columns each are provided with a transfer electrode that is independent of
those of other vertical last stages of the m columns so that an operation of transferring
signal charges from the vertical last stages concerned to the horizontal transfer part is
controlled independently of said other vertical last stages,

the integer m is $2n+1$ (n denotes an integer of 1 or higher), and

signal charges of pixels included in each of first and second pixel mixture groups
are added together in the horizontal transfer part,

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where the first pixel mixture groups each are composed of $2n+1$ (n denotes an integer of 1 or higher) pixels arranged at every other pixel in a horizontal direction of the bidimensionally arranged pixels, and

the second pixel mixture groups each are composed of $2n+1$ pixels that are arranged at every other pixel and are pixels other than those of the first pixel mixture groups in the horizontal direction of the bidimensionally arranged pixels, with centers of gravity of the pixels of the respective second pixel mixture groups each being located at an equal distance from centers of gravity of the pixels of two first pixel mixture groups adjacent thereto,

wherein the vertical last stages located closest to the horizontal transfer part of the vertical transfer parts have transfer electrodes formed to have identical configurations repeated every three columns,

vertical last stages of at least the second and third columns of the three columns, counted as from an output side of the horizontal transfer part, each are provided with a transfer electrode that is independent of those of the other vertical last stages so that an operation of transferring signal charges from the respective vertical last stages concerned to the horizontal transfer part is controlled independently of the other vertical last stages,

wherein a vertical last stage of each column is formed with more than six transfer electrodes, and

in all vertical transfer parts of three columns adjoining each other, among the six transfer electrodes, those located second, fourth, and sixth from a side of the horizontal transfer part are independent electrodes that are independent of those of vertical last stages of the other columns, and the electrodes other than those located second, fourth, and sixth are electrodes common to the other stages of the respective vertical transfer parts.

21. (Currently Amended) The A solid-state image sensing device comprising:
according to claim 6,

vertical transfer parts provided corresponding to respective columns of bidimensionally arranged pixels to vertically transfer signal charges read out from the pixels; and

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a horizontal transfer part for horizontally transferring the signal charges received from the vertical transfer parts,

wherein the vertical transfer parts include transfer stages, those located closest to the horizontal transfer part being vertical last stages, and the vertical last stages have transfer electrodes formed to have identical configurations repeated every m (m denotes an integer of 2 or higher) columns,

vertical last stages of columns other than one of the m columns or all vertical last stages of the m columns each are provided with a transfer electrode that is independent of those of other vertical last stages of the m columns so that an operation of transferring signal charges from the vertical last stages concerned to the horizontal transfer part is controlled independently of said other vertical last stages,

the integer m is $2n+1$ (n denotes an integer of 1 or higher), and

signal charges of pixels included in each of first and second pixel mixture groups are added together in the horizontal transfer part,

where the first pixel mixture groups each are composed of $2n+1$ (n denotes an integer of 1 or higher) pixels arranged at every other pixel in a horizontal direction of the bidimensionally arranged pixels, and

the second pixel mixture groups each are composed of $2n+1$ pixels that are arranged at every other pixel and are pixels other than those of the first pixel mixture groups in the horizontal direction of the bidimensionally arranged pixels, with centers of gravity of the pixels of the respective second pixel mixture groups each being located at an equal distance from centers of gravity of the pixels of two first pixel mixture groups adjacent thereto,

wherein the vertical last stages located closest to the horizontal transfer part of the vertical transfer parts have transfer electrodes formed to have identical configurations repeated every three columns,

vertical last stages of at least the second and third columns of the three columns, counted as from an output side of the horizontal transfer part, each are provided with a transfer electrode that is independent of those of the other vertical last stages so that an operation of transferring signal charges from the respective vertical last stages concerned to the horizontal transfer part is controlled independently of the other vertical last stages,

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~~wherein~~ a vertical last stage of each column is formed with more than six transfer electrodes,

in vertical transfer parts of two of three columns adjoining each other, among the transfer electrodes, those located second, fourth, and sixth from a side of the horizontal transfer part are independent electrodes that are independent of those of vertical last stages of the other columns and the electrodes other than those located second, fourth, and sixth are electrodes common to the other stages of the respective vertical transfer parts, and

in a vertical transfer part of a remaining one of the three columns adjoining each other, all the transfer electrodes are electrodes common to the other stages of the vertical transfer part concerned.

22. (Currently Amended) ~~The~~ A solid-state image sensing device comprising:
~~according to claim 6,~~

vertical transfer parts provided corresponding to respective columns of
bidimensionally arranged pixels to vertically transfer signal charges read out from the
pixels; and

a horizontal transfer part for horizontally transferring the signal charges received
from the vertical transfer parts,

wherein the vertical transfer parts include transfer stages, those located closest to
the horizontal transfer part being vertical last stages, and the vertical last stages have
transfer electrodes formed to have identical configurations repeated every m (m denotes
an integer of 2 or higher) columns,

vertical last stages of columns other than one of the m columns or all vertical last
stages of the m columns each are provided with a transfer electrode that is independent of
those of other vertical last stages of the m columns so that an operation of transferring
signal charges from the vertical last stages concerned to the horizontal transfer part is
controlled independently of said other vertical last stages,

the integer m is $2n+1$ (n denotes an integer of 1 or higher), and

signal charges of pixels included in each of first and second pixel mixture groups
are added together in the horizontal transfer part.

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where the first pixel mixture groups each are composed of $2n+1$ (n denotes an integer of 1 or higher) pixels arranged at every other pixel in a horizontal direction of the bidimensionally arranged pixels, and

the second pixel mixture groups each are composed of $2n+1$ pixels that are arranged at every other pixel and are pixels other than those of the first pixel mixture groups in the horizontal direction of the bidimensionally arranged pixels, with centers of gravity of the pixels of the respective second pixel mixture groups each being located at an equal distance from centers of gravity of the pixels of two first pixel mixture groups adjacent thereto,

wherein the vertical last stages located closest to the horizontal transfer part of the vertical transfer parts have transfer electrodes formed to have identical configurations repeated every three columns,

vertical last stages of at least the second and third columns of the three columns, counted as from an output side of the horizontal transfer part, each are provided with a transfer electrode that is independent of those of the other vertical last stages so that an operation of transferring signal charges from the respective vertical last stages concerned to the horizontal transfer part is controlled independently of the other vertical last stages,

wherein a vertical last stage of each column is formed with more than four transfer electrodes, and

in vertical transfer parts of at least two of three columns adjoining each other, among the transfer electrodes, those located second and fourth from a side of the horizontal transfer part are independent electrodes that are independent of those of vertical last stages of the other columns, and in vertical transfer parts of all the three columns adjoining each other, those located first and third from the side of the horizontal transfer part are different electrodes from those provided in the other stages of the respective vertical transfer parts.

23. (Currently Amended) The A solid-state image sensing device comprising:
according to claim 6,

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vertical transfer parts provided corresponding to respective columns of bidimensionally arranged pixels to vertically transfer signal charges read out from the pixels; and

a horizontal transfer part for horizontally transferring the signal charges received from the vertical transfer parts,

wherein the vertical transfer parts include transfer stages, those located closest to the horizontal transfer part being vertical last stages, and the vertical last stages have transfer electrodes formed to have identical configurations repeated every m (m denotes an integer of 2 or higher) columns,

vertical last stages of columns other than one of the m columns or all vertical last stages of the m columns each are provided with a transfer electrode that is independent of those of other vertical last stages of the m columns so that an operation of transferring signal charges from the vertical last stages concerned to the horizontal transfer part is controlled independently of said other vertical last stages,

the integer m is $2n+1$ (n denotes an integer of 1 or higher), and

signal charges of pixels included in each of first and second pixel mixture groups are added together in the horizontal transfer part,

where the first pixel mixture groups each are composed of $2n+1$ (n denotes an integer of 1 or higher) pixels arranged at every other pixel in a horizontal direction of the bidimensionally arranged pixels, and

the second pixel mixture groups each are composed of $2n+1$ pixels that are arranged at every other pixel and are pixels other than those of the first pixel mixture groups in the horizontal direction of the bidimensionally arranged pixels, with centers of gravity of the pixels of the respective second pixel mixture groups each being located at an equal distance from centers of gravity of the pixels of two first pixel mixture groups adjacent thereto,

wherein the vertical last stages located closest to the horizontal transfer part of the vertical transfer parts have transfer electrodes formed to have identical configurations repeated every three columns,

vertical last stages of at least the second and third columns of the three columns, counted as from an output side of the horizontal transfer part, each are provided with a

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transfer electrode that is independent of those of the other vertical last stages so that an operation of transferring signal charges from the respective vertical last stages concerned to the horizontal transfer part is controlled independently of the other vertical last stages,

wherein a vertical last stage of each column is formed with more than six transfer electrodes, and

in vertical transfer parts of at least two of three columns adjoining each other, among the transfer electrodes, those located second, fourth, and sixth from a side of the horizontal transfer part are independent electrodes that are independent of those of vertical last stages of the other columns, and in vertical transfer parts of all the three columns adjoining each other, those located first, third, and fifth from the side of the horizontal transfer part are different electrodes from those provided in the other stages of the respective vertical transfer parts.

24. (Currently Amended) The A solid-state image sensing device comprising:
according to claim 3;

vertical transfer parts provided corresponding to respective columns of bidimensionally arranged pixels to vertically transfer signal charges read out from the pixels; and

a horizontal transfer part for horizontally transferring the signal charges received from the vertical transfer parts,

wherein the vertical transfer parts include transfer stages, those located closest to the horizontal transfer part being vertical last stages, and the vertical last stages have transfer electrodes formed to have identical configurations repeated every m (m denotes an integer of 2 or higher) columns,

vertical last stages of columns other than one of the m columns or all vertical last stages of the m columns each are provided with a transfer electrode that is independent of those of other vertical last stages of the m columns so that an operation of transferring signal charges from the vertical last stages concerned to the horizontal transfer part is controlled independently of said other vertical last stages,

the integer m is $2n+1$ (n denotes an integer of 1 or higher), and

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signal charges of pixels included in each of first and second pixel mixture groups are added together in the horizontal transfer part,

where the first pixel mixture groups each are composed of $2n+1$ (n denotes an integer of 1 or higher) pixels arranged at every other pixel in a horizontal direction of the bidimensionally arranged pixels, and

the second pixel mixture groups each are composed of $2n+1$ pixels that are arranged at every other pixel and are pixels other than those of the first pixel mixture groups in the horizontal direction of the bidimensionally arranged pixels, with centers of gravity of the pixels of the respective second pixel mixture groups each being located at an equal distance from centers of gravity of the pixels of two first pixel mixture groups adjacent thereto, and

wherein each stage of the vertical transfer parts is formed with more than four transfer electrodes, and in transfer stages other than the vertical last stage of each of the vertical transfer parts, the transfer electrodes located even numbered from a side of the horizontal transfer part each are formed of an electrode film of a first layer, as an electrode common to all columns, and the transfer electrodes located odd numbered from the side of the horizontal transfer part each are formed of an electrode film of a second layer as an electrode common to all the columns, the second layer being an upper layer formed above the first layer, and

in the respective vertical last stages, the electrodes located second and fourth from the side of the horizontal transfer part each are formed, as an independent electrode, of an electrode film identical to that of the second layer that is divided into insular parts located corresponding to the respective columns.

Claims 25-38. (Cancelled)

39. (Currently Amended) ~~The~~ A solid-state image sensing device comprising:
~~according to claim 3,~~

vertical transfer parts provided corresponding to respective columns of bidimensionally arranged pixels to vertically transfer signal charges read out from the pixels; and

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a horizontal transfer part for horizontally transferring the signal charges received from the vertical transfer parts,

wherein the vertical transfer parts include transfer stages, those located closest to the horizontal transfer part being vertical last stages, and the vertical last stages have transfer electrodes formed to have identical configurations repeated every m (m denotes an integer of 2 or higher) columns,

vertical last stages of columns other than one of the m columns or all vertical last stages of the m columns each are provided with a transfer electrode that is independent of those of other vertical last stages of the m columns so that an operation of transferring signal charges from the vertical last stages concerned to the horizontal transfer part is controlled independently of said other vertical last stages,

the integer m is $2n+1$ (n denotes an integer of 1 or higher), and

signal charges of pixels included in each of first and second pixel mixture groups are added together in the horizontal transfer part,

where the first pixel mixture groups each are composed of $2n+1$ (n denotes an integer of 1 or higher) pixels arranged at every other pixel in a horizontal direction of the bidimensionally arranged pixels, and

the second pixel mixture groups each are composed of $2n+1$ pixels that are arranged at every other pixel and are pixels other than those of the first pixel mixture groups in the horizontal direction of the bidimensionally arranged pixels, with centers of gravity of the pixels of the respective second pixel mixture groups each being located at an equal distance from centers of gravity of the pixels of two first pixel mixture groups adjacent thereto, and

wherein each stage of the vertical transfer parts is formed with more than four transfer electrodes, and in transfer stages other than the vertical last stage of each of the vertical transfer parts, the transfer electrodes located even numbered from a side of the horizontal transfer part each are formed of an electrode film of a first layer, as an electrode common to all columns, and the transfer electrodes located odd numbered from the side of the horizontal transfer part each are formed of an electrode film of a second layer as an electrode common to all columns, the second layer being an upper layer formed above the first layer, and

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in the respective vertical last stages, the electrodes located second, fourth and sixth from the side of the horizontal transfer part each are formed, as an independent electrode, of an electrode film identical to that of the second layer that is divided into insular parts located corresponding to the respective columns.